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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Steven Durham

Serial No.: 10/679,075

Group Art Unit: 3637

Confirmation No.: 3549

Filed: 10/03/2003

Examiner: A, PHI DIEU TRAN

For: **ENERGY GENERATING SHELTER SYSTEM AND METHOD****DECLARATION UNDER 37 C.F.R. § 1.132**

Relative to the above-identified patent application, I, Charles E. (Ned) Forbes, do herewith declare as follows:

1. I am a competent adult and a citizen of the United States of America.
2. I have personal knowledge of the matters contained herein, and if called as a witness I could and would testify thereto under oath.
3. In 1971 I earned a Ph.D. in Inorganic Chemistry, from the Massachusetts Institute of Technology., in Cambridge, MA.
4. I have over thirty five (35) years of professional chemistry experience.
5. From 1975 to 1986, as a Senior Research Chemist at Allied Signal Corporation, I conducted NMR and ESR research in conducting polymers and other subject matter.

6. From 1986-1998, as Research Associate at Hoechst Research & Technology , I conducted research in various areas including coated polymethacrylate films for high-definition plasma display televisions.
7. From 1998-Present, I have served as Principal of Lonach Consulting, where I consult with various institutional clients in various areas of Chemistry and related matters.
8. From 2000- 2005, I have served as Director of Technology for Visible Tech-Knowledgy, where I fabricated, for the first time, active matrix backplanes on plastic film for RFID tags; developed technologies for radio frequency identification tags and labels and conducted research at Princeton University-Department of Electrical Engineering PRISM facility.
9. From 2001 – 2005, as a visiting collaborator at Princeton University, I researched novel active matrix backplanes circuits on plastic film for electronic paper displays and RFID tags. I was awarded and managed, as principle investigator, two NSF SBIR Phase I grants.
10. I have over thirty technical publications and patents.
11. I am an active member of several professional organizations, including Chemical Consultants Network, Association of Consulting Chemists & Chemical Engineers, and American Chemical Society.
12. I have extensive experience in photovoltaics and light emitting materials.
13. I have reviewed U.S. patent applications 10/679,075 and 11/438,195 ("Patent Applications"), and responses to non-final office actions to which this declaration is being attached.

14. I have reviewed the office actions for the Patent Applications.

15. The Patent Applications describe and claim a canopy comprising several photovoltaic elements driven by both sunlight and radiation emitted from an LED element, which may be photoluminescent (e.g., phosphorescent) and/or electrically powered by the photovoltaic layers. In one embodiment, a transparent light emitting layer is disposed between two transparent photovoltaic layers configured to produce electrical energy from ambient light radiation (e.g., sunlight) and radiation emitted by the LED layer. In another embodiment, light emitting elements and transparent photovoltaic elements are provided on the same substrate with the photovoltaic elements configured to convert sunlight and light radiation from the light emitting elements into electrical current. Advantageously, each embodiment provides a photovoltaic light emitting device that can emit light, including illuminated indicia, at night without a battery. Additionally, because the photovoltaic elements produce electric energy from radiation emitted from the light emitting elements, electrical energy is conserved. As the light emitting element may include phosphorescent elements, absorbed energy may be released relatively slowly in the form of light. Such light may be received by the photovoltaic elements to generate additional electrical power during nighttime.

16. I have reviewed all references cited by the examiner and applicant for the Patent Applications, including Lane (D192723), Kowalski (5570000), Ho (6895145), Hiroshi (3278811), Schoniger et al (4903172), Kroger et al (4400244), Dinwoodie (D408554) and Albright et al (5674325) (collectively, the "Prior Art").

17. Kowalski (5570000) and Schoniger et al (4903172) affirmatively teach away from the claimed invention.

18. Lane (D192723) discloses an ornamental design for a conventional drive-in canopy. 17.
19. Kowalski (5570000) discloses a solar powered light assembly for a sign. Photovoltaic cells convert sunlight to electrical energy, which is stored in a battery operatively connected to a photocell and lamp. During nighttime, the photocell allows the battery to power the lamp which illuminates the sign.
20. Kowalski (5570000) teaches away from Applicant's invention because, using a photocell and relay, Kowalski switches from the solar panel at nighttime and powers a lamp from a battery during nighttime. [Kowalski col. 3, lines 4-20].
21. Ho (6895145) discloses a spherical lens used to focus and direct light into an optical fiber for transmitting the focused light to an energy converter, a lighting or heating system, or a lighting or heating apparatus. The lighting may include an LED or Organic Light Emitting Diode ("OLED") configured to provide nighttime and/or low level illumination. However, none of the radiation emitted from the LED or OLED is used to generate electricity.
22. Hiroshi (3278811) discloses a photo-electric transducer (i.e., a double sided photovoltaic cell) which produces an electric current in response to radiant energy directed to either one or both sides. Hiroshi also teaches reflecting light to one or both sides using a mirror. The light must be supplied from an external source, as the described structure cannot be internally illuminated.
23. Schoniger et al (4903172) discloses an illuminated display comprising a fluorescing photoconductive plate with display symbols (or their negatives) applied at the rear surface of the photoconductive plate. The display may be powered by conventional solar cells and a battery.

24. Schoniger et al (4903172) teaches away from Applicant's invention because Schoniger switches off the solar panel at nighttime and powers the LEDs from a battery during nighttime. [Schoniger, Col. 4, lines 53-68].
25. Kroger et al (4400244) teaches a photovoltaic cell created by cathodically depositing semiconductor forming material at a cathode of an electrolytic cell to produce a semiconductor compound which is photoreactive. The cell may be transparent and may be completely enveloped within and contained by a transparent container.
26. Ditwoodie (D408,554) teaches an ornamental design for a solar electric shade system. One upwardly facing layer of solar panels is shown.
27. Albright et al (5674325) teaches a thin film photovoltaic device and a method of manufacturing the device. The thin film photovoltaic device comprises a film layer having small particles held in an electrically insulating matrix material to reduce the potential for electrical shorting through the film layer. The particles are n-type or p-type semiconductor material in crystalline form having a bulk crystal morphology.
28. A combination of the Prior Art references would not replicate Applicant's claimed inventions, due to claim features not found in any reference, and due to fundamental differences between the references and the invention.
29. The cited patents fail to teach or suggest a canopy comprising multiple photovoltaic layers driven by both sunlight and radiation emitted from an embedded LED powered by the photovoltaic layers, as recited in amended claims 1 and 2.

30. The arrangement of two photovoltaic layers configured to produce electrical energy from ambient light radiation (e.g., sunlight) and radiation emitted by an LED powered by at least one of the photovoltaic layers is novel, unique, original and nonobvious.
31. The Prior Art does not teach or suggest a plurality of photovoltaic layers powered by sunlight with at least one layer also powered by LED light from an LED powered by the photovoltaic layers.
32. The Prior Art does not teach or suggest a canopy comprising a multi-layer assembly comprising a light emitting layer embedded between two separate photovoltaic layers that are configured to convert sunlight and light radiation from the embedded emitting layer into electrical current, as recited in newly added claim 8.
33. The Prior Art does not teach or suggest a canopy comprising a assembly comprising a light emitting element and a photovoltaic element on the same substrate with the photovoltaic element configured to convert sunlight and light radiation from the light emitting element into electrical current, as recited in newly added claim 19.
34. The Prior Art does not disclose, teach or suggest any photovoltaic light emitting device that can be used outdoors at night without a battery.
35. The Prior Art does not disclose, teach or suggest any assembly comprising a first light emitting diode element configured to produce an electrical current when exposed to sunlight and further configured to emit radiation when an electrical current is supplied to the first light emitting diode element; and a second light emitting diode element configured to produce an

electrical current when exposed to sunlight and further configured to emit radiation when an electrical current is supplied to the second light emitting diode element, as recited in claim 26

36. The Prior Art does not disclose, teach or suggest any canopy assembly comprising a light emitting display and a photovoltaic element operably coupled to the light emitting display, with the photovoltaic element being configured to supply electric current to the light emitting display, and further configured to produce electric current from radiation emitted from the light emitting display, as recited in claim 35.

37. There is no rationale to combine the Prior Art references and modify the Prior Art to achieve Applicant's invention.

38. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a plurality of photovoltaic layers powered by sunlight with at least one layer also powered by LED light from an LED powered by the photovoltaic layers.

39. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising multiple photovoltaic layers driven by both sunlight and radiation emitted from an LED powered by the photovoltaic layers, as recited in amended claims 1 and 2.

40. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising two photovoltaic layers configured to produce electrical energy from ambient light radiation (e.g., sunlight) and radiation emitted by an LED powered by at least one of the photovoltaic layers.

41. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising a plurality of photovoltaic layers powered by sunlight with at least one layer also powered by LED light from an LED powered by the photovoltaic layers.

42. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising a light emitting layer embedded between two separate photovoltaic layers that are configured to convert sunlight and light radiation from the embedded emitting layer into electrical current, as recited in newly added claim 8.

43. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising a light emitting element and a photovoltaic element on the same substrate with the photovoltaic element configured to convert sunlight and light radiation from the light emitting element into electrical current, as recited in newly added claim 19.

44. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising a phosphorescent light emitting element on the same substrate with a photovoltaic element configured to convert sunlight and light radiation from the light emitting element into electrical current.

45. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide a canopy comprising a phosphorescent light emitting element between photovoltaic elements configured to convert sunlight and light radiation from the light emitting element into electrical current.

46. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide an assembly comprising a first light emitting diode element configured to produce an electrical current when exposed to sunlight and further configured to emit radiation when an electrical current is supplied to the first light emitting diode element; and a second light emitting diode element configured to produce an electrical current when exposed to sunlight and further configured to emit radiation when an electrical current is supplied to the second light emitting diode element, as recited in claim 26

47. At the time of the inventions and filing for the Patent Applications, it would not have been obvious to provide an assembly comprising a light emitting display and a photovoltaic element operably coupled to the light emitting display, with the photovoltaic element being configured to supply electric current to the light emitting display, and further configured to produce electric current from radiation emitted from the light emitting display, as recited in claim 35.

48. The Prior Art does not disclose, teach or suggest any photovoltaic light emitting device that can be used outdoors at night without a battery.

49. In my opinion configuring light emitting elements such as phosphorescent elements, LEDs and/or OLEDs, between photovoltaic carport roof layers was not inherently obvious or generally known, or in common practice with phosphorescent, LED, OLED and/or photovoltaic technology as of effective filing date of the Patent Applications.

50. In my opinion configuring light emitting elements such as phosphorescent elements, LEDs and/or OLEDs, on the same substrate as photovoltaic elements to form a carport roof was

not inherently obvious or generally known, or in common practice with phosphorescent, LED, OLED and/or photovoltaic technology as of effective filing date of the Patent Applications.

51. In my opinion, the use of phosphorescent materials, short lived glow organic and/or inorganic light emitting coatings as a light emitting element to provide visible light and power a photovoltaic element was not inherently obvious or generally known, or in common practice with phosphorescent, LED, OLED and/or photovoltaic technology as of effective filing date of the Patent Applications.

52. In my opinion, an assembly comprising a first light emitting diode element configured to produce an electrical current when exposed to sunlight and further configured to emit radiation when an electrical current is supplied to the first light emitting diode element; and a second light emitting diode element configured to produce an electrical current when exposed to sunlight and further configured to emit radiation when an electrical current is supplied to the second light emitting diode element, as recited in claim 26, was not inherently obvious or generally known, or in common practice as of effective filing date of the Patent Applications.

53. In my opinion, an assembly comprising a light emitting display and a photovoltaic element operably coupled to the light emitting display, with the photovoltaic element being configured to supply electric current to the light emitting display, and further configured to produce electric current from radiation emitted from the light emitting display, as recited in claim 35, was not inherently obvious or generally known, or in common practice as of effective filing date of the Patent Applications..

54. A potential benefit from the technologies described thus far by Mr. Durham's unique composition of matter carry's the possibility of using the OLEDs to display video by using the device as configured (in layer form or on the same substrate with both PV layers acting as the anode/cathode combined with middle layer OLED).

55. Applicant's inventions claimed in the Patent Applications satisfy a long felt but previously unsolved need to conserve energy, improve efficiency and prolong the generation of electric current by photovoltaic elements without ambient light.

I, the undersigned declarant, further state that the above statements are made with the knowledge that willful false statements and the like are punishable by fine and/or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any such willful false statements may jeopardize the validity of this application or any patent resulting therefrom.

Charles E. (Ned) Forbes:


Date: 11/30/2007